

## **Section X: Extraction by The ANOR Procedure (The Alternate Non-Aqueous Organic Ratio**

### *I. Introduction:*

This procedure produces drugs of purity. It is a dry extraction technique that renders certain solvents (petroleum ether, chloroform) acidic or basic to obtain the free acid, ion-pair, or free base of the drug. This procedure can be used for the extraction of certain narcotic analgesics (opiates), such as Oxycodone and Morphine, as well as for barbiturates. This procedure can also be used to extract certain drugs whose ion-pairs are soluble in organic solvents (especially chloroform). Among these drugs are Heroin, Cocaine, Phencyclidine, and Pentazocine as the HCl salts. Tables I through IV show a listing of drugs and their appropriate extraction solvent system. By varying organic solvents, using combinations of solvents at various ratios and adjusting pH with  $\text{NH}_4\text{OH}$  or HCl, not only may single drug items be separated by the ANOR procedure, but mixtures containing several drugs may be selectively separated. This extraction procedure is followed by analysis on an Infrared Spectrophotometer.

### *II. Reagents:*

- A.) Chloroform
- B.) Petroleum ether
- C.) Hexane
- D.) Concentrated Hydrochloric acid (HCl)
- E.) Ammonium hydroxide ( $\text{NH}_4\text{OH}$ , 30%)

### *III. Equipment:*

- A.) 250 mL separatory funnel
- B.) Filter paper
- C.) 50 mL beaker
- D.) Disposable pipettes
- E.) Glass funnel
- F.) pH paper
- G.) Hot sand bath
- H.) Infrared Spectrophotometer

### *IV. Procedure:*

- A.) Determine proper solvent system: organic solvent saturated with  $\text{NH}_4\text{OH}$  or HCl (1 part acid or base to 10 parts solvent)
- B.) Store solvent in a separatory funnel if the acid or base is lighter than the solvent (ex. chloroform)

- C.) Store solvent in a reagent bottle if the acid or base is heavier than the solvent (ex. petroleum ether and hexane) so the upper layer can be pipetted out when needed.
- D.) Place sample into filter paper and elute with proper solvent system. Catch the eluate in a beaker placed underneath the funnel.
- E.) The free acid or free base flows through the filter paper along with the solvent into the beaker.
- F.) Evaporate solvent to dryness on a hot sand bath to obtain the free acid, free base, or ion pair
- G.) Run on Infrared Spectrophotometer.

*V. Results:*

- A.) Record in the logbook the results obtained by the I.R. and that the ANOR procedure was used to extract the drug.
- B.) Also record the results, along with initials and date of analysis, on the sample cards that will be turned in to generate Certificates of Analysis.